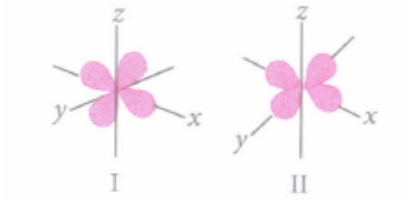
RAVI MATHS TUITION CENTRE , WHATSAPP - 8056206308

Time : 100 Mins **CHEMISTRY TEST 3 STRUCTURE OF ATOM AND NUCLEAR CHEMISTRY 1** **Marks : 274**

1. The Bohr's orbit radius for the hydrogen atom (n=1) is approximately 0.53 A. The radius for the first excited state (n = 2) orbit is:
   a) 0.27 A b) 1.27 A c) 2.12 A d) 3.12 A
2. Observe the given boundary surface diagrams of two orbitals I and II and choose the correct option.



   a) I-$d_{x^2-y^2}$, II-d_{yz} b) I-d_{yz}, II-$d_{x^2-y^2}$ c) I-d_{xz}, II-d_{z^2} d) I-d_{xy}, II-dxz
3. Assertion: All the isotopes of a given element show same chemical behaviour.
   Reason: Isotopes have different number of neutrons present in the nucleus.
   a) If both assertion and reason are true and reason is the correct explanation of assertion
   b) If both assertion and reason are true but reason is not the correct explanation of assertion
   c) If assertion is true but reason is false d) If both assertion and reason are false
4. Which of the following species is not stable?
   a) $[GeCl_6]^2$ b) [Sn(OH)$_6$]2 c) $[SiCl_6]^{2-}$ d) $[SiF_6]^2$
5. $_{92}U^{235} + {}_0n^1 \rightarrow$ fission product + neutron $+3.2 \times 10^{-11}$ J The energy released, when 1 g of $_{92}U^{235}$ finally undergoes fission, is:
   a) 12.75 x 10^8 kJ b) 18.60 x 10^9 kJ c) 8.21 x 10^7 kJ d) 6.55 x 10^6 kJ
6. What are the possible values of n, l and m_1 for an atomic orbital 4f?
   a) n = 4, l = 0, 1, 2, 3, m_1 = -2, -1, 0, +1, +2 b) n = 4, l = 3, m_1 = -3, -2, -1, 0, +1, +2, +3
   c) n = 4, l = 2, m_1 = -2, -1, 0, +1, +2, +3 d) n = 4, l = 0, 1, m_1 = -1, 0, +1
7. The number of nodes and nodal planes in 4p orbital are respectively
   a) 2,1 b) 1,2 c) 2,3 d) 3,2
8. The probability of finding out an electron at a point within an atom is proportional to the
   a) square of the orbital wave function i.e., Ψ^2 b) orbital wave function i.e., Ψ
   c) Hamiltonian operator i.e., H d) principal quantum number i.e., n
9. An electron is revolving in the 2nd orbit of He^+ ion. To this if 12.1 eV of energy supplied. Then to which orbit it will be excited.
   a) 6 b) 8 c) 4 d) 2
10. The de Broglie wavelength associated with a ball of mass 200 g and moving at a speed of 5 metres/hour, is of the order of (h = 6.625 x 10^{-34} Js) is:
    a) 10^{-15} m b) 10^{-20} m c) 10^{-25} m d) 10^{-30} m
11. If travelling at same speeds, which of the following matter waves have the shortest wavelength?
    a) Electron b) Alpha particle (He^{2+}) c) Neutron d) Proton
12. The radius of the stationary state which is also called Bohr radius is given by the expression $r_n = n^2a_o$ where the value of a_o is
    a) 52.9 pm b) 5.29 pm c) 529 pm d) 0.529 pm

13. The number of neutrons in the dipositive zinc ion (Mass number or Zn = 65)
    a) 35 b) 33 c) 65 d) 67

14. Three energy levels P. Q, R of a certain atom are such that $E_p < E_Q < E_R$. If λ_1, $\lambda_2$and λ_3 are the wave length or radiation corresponding to transition R → Q ; Q → P and R → P respectively. The correct relationship between λ_1, λ_2 and λ_3 is
    a) $\lambda_1+\lambda_2=\lambda_3$ b) $\frac{1}{\lambda_3}=\frac{1}{\lambda_1}+\frac{1}{\lambda_2}$ c) $\lambda_3=\sqrt{\lambda_1\lambda_2}$ d) $\frac{2}{\lambda_3}=\frac{1}{\lambda_1}+\frac{1}{\lambda_2}$

15. Which of the following options does not represent ground state electronic configuration of an atom?
    a) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^8\ 4s^2$ b) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^9\ 4s^2$ c) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^{10}\ 4s^1$
    d) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p6\ 3d^5\ 4s^1$

16. Which of the following explains the sequence of filling electrons in different subshells?
    a) Hund's rule b) Aufbau principle c) Pauli's principle d) All of these

17. What is the maximum number of orbitals that can be identified with the following quantum numbers?
    n = 3, l = +1, m_1 = 0
    a) 1 b) 2 c) 3 d) 4

18. Which of the following quantum numbers are correct for the outermost electron of sodium atom?
    a) n = 4, 1 = 0, m = 0, s = +1/2 b) n = 3, l = 0, m = 0, s = -1/2 c) n=3, l= 1, m=+1, s=+1/2
    d) n=3, l=2, m=-l, s=-1/2

19. When an electron makes a transition from (n+1) state to n^{th} state, the frequency of emitted radiations is related to 'n' according to (n>>1):
    a) v= $\frac{2CRZ^2}{n^3}$ b) v= $\frac{CRZ^2}{n^4}$ c) v= $\frac{CRZ^2}{n^2}$ d) v= $\frac{2CRZ^2}{n^2}$

20. The incorrect statement regarding cathode rays is
    a) They travel in straight line b) They depend on the nature of the gas
    c) They are deflected by magnetic as well as electric fields d) They produce mechanical effects

21. The probability of finding electron in XY plane for P_z- orbital is
    a) 100% b) 50% c) 99.9% d) 0%

22. The ratio of energies of two photons of wavelengths 2000 A° and 4000 A°

    a) 1:4 b) 4:1 c) 1:2 d) 2:1

23. The ratio of the wave lengths of the first line in the Lyman series of the spectrum of Hydorgen atom and the first line in the Balmer series of the spectrum of He^+ is :
    a) 20/27 b) 27/20 c) 27/5 d) 5/27

24. Assertion: In Rutherford's α-particle scattering experiment, most of the α-particles were deflected by nearly 180^0.
    Reason: The positive charge of the atom is spread throughout the atom that repelled and deflected the positively charged α-particles.
    a) If both assertion and reason are true and reason is the correct explanation of assertion
    b) If both assertion and reason are true but reason is not the correct explanation of assertion
    c) If assertion is true but reason is false d) If both assertion and reason are false

25. Which of the following configuration is correct for iron?
    a) $1s^2,\ 2s^22p^6,\ 3s^23p^6\ 3d^5$ b) $1s^2,2s^22p^6,\ 3s^23p^6,\ 4s^2,\ 3d^5$ c) $1s^2,2s^22p^6,\ 3s^23p^6,\ 4s^2,3d^7$
    d) $1s^2,2s^22p^6,\ 3s^23p^6\ 3d^6,4s^2$

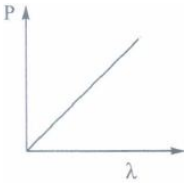
26. The Bohr's energy of a stationary state of hydrogen atom is given as $E_n=\frac{-2\pi me^4}{n^2h^2}$. Putting the values of m and e for n^{th} energy level which is not the correct value?
    a) $E_n=\frac{-21.8\times10^{-19}}{n^2}$ J $atom^{-1}$ b) $E_n=\frac{-13.6}{n^2}$ eV $atom^{-1}$ c) $E_n=\frac{-1312}{n^2}$ kJ mol^{-1}
    d) $E_n=\frac{-12.8\times10^{-19}}{n^2}erg^{-1}\ atom^{-1}$

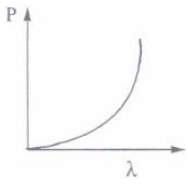
27. The circumference of 3rd Bohr orbit in H-atom is:
    a) 3×10^{-7}cm b) 3×10^{-8}cm c) 3×10^{-6}cm d) 4.3×10^{-9}cm

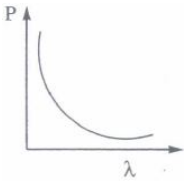
28. What minimum amount of energy is required to bring an electron from ground state of Be^{3+} to in infinity?
a) 4.358 x 10^{-18} J/atom b) 2.179 x 10^{-18} J/atom c) 3.4864 x 10^{-17} J/atom d) 8.716 x 10^{-18} J/atom

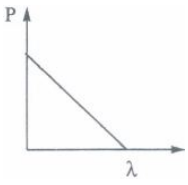
29. The frequency of radiation emitted when the electron falls from n = 4 to n = 1 in a hydrogen atom will be (Given ionisation energy of H = 2.18 x 10^{-18}J $atom^{-1}$ and h = 6.625 x 10^{-34} J-s):
a) 1.03 x $10^{15}s^{-1}$ b) 2.00 x $10^{15}s^{-1}$ c) 3.08 x $10^{15}s^{-1}$ d) 1.54 x $10^{15}s^{-1}$

30. The graph between momentum p and de-Broglie wavelength λ of photon is

a) 

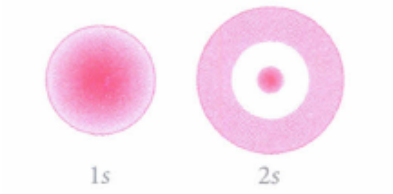
b) 

c) 

d) 

31. Number of unpaired electrons in N^{2+} is/are
a) 2 b) 0 c) 1 d) 3

32. The probability density plots of Is and 2s atomic orbitals are given in figures.



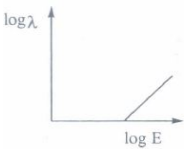
The density of dots in a region represents the probability density of finding electrons in the region. On the basis of the above diagram, which of the following statements is incorrect?
a) Is and 2s orbitals are spherical in shape
b) The probability of finding the electron is maximum near the nucleus
c) The probability of finding the electron at a given distance is equal in all directions
d) The probability density of electrons for 2s orbital decreases uniformly as distance from the nucleus increases

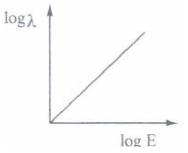
33. What will be the wave number of yellow radiation having wavelength 240 nm?
a) 1.724 x 10^4 cm^{-1} b) 4.16 x 10^6 m^{-1} c) 4 x 10^{14} Hz d) 219.3 x 10^3 cm^{-1}

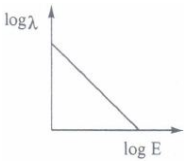
34. Which of the following configurations represents a noble gas?
a) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^{10}\ 4s^2\ 4p^6\ 4d^{10}\ 5s^2$ b) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^{10}\ 4s^2\ 4f^{14}\ 5s^2$
c) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^{10}\ 4s^2\ 4p^6\ 4d^{10}\ 5s^2\ 5p^6$ d) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^{10}\ 4s^2\ 4p^6\ 4d^{10}\ 5s^2\ 5p^3$

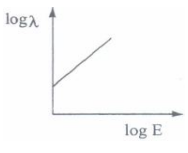
35. What will be the orbital angular momentum of an electron in 2s-orbital?
a) Zero b) One c) Two d) Three

36. The graph between energy of an electron and its de-Broglie wavelength λ is

a) 

b) 

c) 

d) 

37. Kinetic energy of photoelectrons is independence _____of incident radiation
a) Wavelength b) Wave number c) Frequency d) Intensity

38. An electron in excited hydrogen atom falls from fifth energy level to second energy level. In which of the following regions, the spectral line will be observed and is part of which series of the atomic spectrum?
a) Visible, Balmer b) Ultraviolet, Lyman c) Infrared, Paschen d) Infrared, Brackett

39. If n = 6, the correct sequence for filling of electrons will be:
a) $ns \rightarrow (n-1)f \rightarrow (n-1)d \rightarrow np$ b) $ns \rightarrow (n-1)f \rightarrow (n-2)d \rightarrow np$
c) $ns \rightarrow (n-2)f \rightarrow (n-1)d \rightarrow np$ d) $ns \rightarrow np(n-1)d \rightarrow (n-2)f$

40. The radius of hydrogen atom in the ground state is 0.53 A. one radius of Li^{2+} ion (at no = 3) in a similar state is:
a) 0.17 A b) 0.53 A c) 0.265 A d) 1.06 A

41. The ratio of the orbit of the 1st three radii in an atom of hydrogen is
a) 1 : 4 : 9 b) 9 : 4 : 1 c) 1 : 2 : 3 d) 3 : 2 : 1

42. What is the trend of energy of Bohr's orbits?

a) Energy of the orbit increases as we move away from the nucleus
b) Energy of the orbit decreases as we move away from the nucleus
c) Energy remains same as we move away from the nucleus d) Energy of Bohr's orbit cannot be calculated

43. No two electrons in an orbital can have parallel spin. This statement emerges from:
a) Hund's rule b) Aufbau principle c) Pauli's exclusion principle d) (n + 1) rule

44. Which of the following designation is impossible?
a) 4f b) 5g c) 2d d) 6p

45. The value of Planck's constant is 6.63 x 10^{34} Js. The speed of light is 3 x 10^{17} nm s^{1}. Which value is closest to the wavelength in nanometer of a quantum of light with frequency of 6 x 10^{15} s^{1}?
a) 25 b) 50 c) 75 d) 10

46. The order of filling of electrons in the orbitals of an atom will be
a) 3d, 4s, 4p, 4d, 5s b) 4s, 3d, 4P, 5s, 4d c) 5s, 4p, 3d, 4d, 5s d) 3d, 4P, 4s, 4d, 5s

47. For a particular value of azimuthal quantum number (l), the total number of magnetic quantum number values (m) is given by
a) $l = \frac{m+1}{2}$ b) $l = \frac{m-1}{2}$ c) $l = \frac{2m+1}{2}$ d) $n = \frac{2l+1}{2}$

48. Which of the following conclusions regarding the structure of atom is based on Rutherford's α-particle scattering experiment?
a) The positive charge is concentrated in a very small volume of the atom
b) The positive charge is scattered with the electrons throughout the atom
c) The volume occupied by the nucleus is half of the volume of atom
d) Most of the space in the atom is occupied by the neutrons

49. If the energy of H-atom in the ground state is -E, the velocity of photo-electron emitted when a photon having energy E_p strikes a stationary Li^{2+} ion in ground state, is given by:
a) $v = \sqrt{\frac{2(E_p - E)}{m}}$ b) $v = \sqrt{\frac{2(E_p + 9E)}{m}}$ c) $v = \sqrt{\frac{2(E_p - 9E)}{m}}$ d) $v = \sqrt{\frac{2(E_p - 3E)}{m}}$

50. The quantum numbers of four electrons (e_1 to e_4) are given below

	n	l	m	s
e_1	3	0	0	$\pm$1/2
e_2	4	0	0	1/2
e_3	3	2	2	-1/2
e_4	3	1	-1	1/2

The correct order of decreasing energy of these electrons is:
a) $e_4 > e_3 > e_2 > e_1$ b) $e_2 > e_3 > e_4 > e_1$ c) $e_3 > e_2 > e_4 > e_1$ d) $e_1 > e_3 > e_4 > e_2$

51. The number of photons of light wave number 'x' in 10 J of energy source is:
a) 10 hcx b) $\frac{hc}{10x}$ c) $\frac{10}{hcx}$ d) $\frac{hcx}{10}$

52. The Schrodinger wave equation for hydrogen atom is $\Psi_{2s} = \frac{1}{4\sqrt{2\pi}}\left(\frac{1}{a_0}\right)^{3/2}\left(2 - \frac{r_0}{a_0}\right) e^{-r/a_0}$ where a_0 is is Bohr's radius. If the radial node in 2s be at r_0 would be equal to:
a) $\frac{a_0}{2}$ b) $2a_0$ c) $\sqrt{2a_0}$ d) $\frac{a_0}{\sqrt{2}}$

53. Uncertainty in position of an electron (mass = 9.1 x 10^{-28g}) moving with a velocity of 3 x 10^4 cm/s accurate upto 0.001% will be (use $\frac{h}{4\pi}$ in uncertainty expression where h = 6.626 x 10^{-27}erg ¯s)
a) 5.76 cm b) 7.68 cm c) 1.93 cm d) 3.84 cm

54. The number of spherical nodes in 3p-orbital is/are:
a) one b) two c) three d) none of the above

55. The electrons identified by quantum numbers n and 1 can be placed in the order of increasing energy as:
    1. n = 4, l = 1
    2. n = 4, l = 0
    3. n = 3, l = 2
    4. n = 4, l = 1
    a) 3 > 4 < 2 < 1 b) 4 < 2 < 3 < 1 c) 2 < 4 < 1 ≤ 3 d) 1 < 3 ≤ 2 < 4

56. Which is the correct order of increasing energy of the listed orbitals in the atom of titanium? (Atomic Number Z = 22)
    a) 4s 3s 3p 3d b) 3s 3p 3d 4s c) 3s 3p 4s 3d d) 3s 4s 3p 3d

57. Two electrons present in M shell will differ in
    a) principal quantum number b) azimuthal quantum number c) magnetic quantum number
    d) spin quantum number

58. Compare the energies of two radiations E_1 with wavelength 800 nm and E_2 with wavelength 400 nm.
    a) $E_1=2E_2$ b) $E_1=E_2$ c) $E_2=2E_1$ d) $E_2=-\frac{1}{2}E_1$

59. The value of Planck's constant is 6.63×10^{-34} Js. The velocity of light is 3.0×10^{8} ms^{-1}, Which value is closest to the wavelength in nanometers of a quantum of light with frequency of 8×10^{15} S^{-1}?
    a) 4×10^{1} b) 3×10^{7} c) 2×10^{-25} d) 5×10^{-18}

60. Atomic number of element in 4th period and 5th column will be
    a) 89 b) 71 c) 73 d) 75

61. What would be the wavelength and name of series respectively for the emission transition for H-atom if it starts from the orbit having radius 1.3225 nm and ends at 211.6 pm?
    a) 434 nm, Balmer b) 434 pm, Paschen c) 545 pm, Pfund d) 600 nm, Lyman

62. The measurement of the electron position if associated with an uncertainty in momentum, which is equal to 1×10^{18} g cm s^{-l}. The uncertainty in electron velocity is, (mass of an electron is 9×10^{-28} g).
    a) 1×10^{9} cms^{-1} b) 1×10^{6} cms^{-1} c) 1×10^{5} cms^{-1} d) 1×10^{11} cms^{-1}

63. As an electron is brought from an infinite distance close of nucleus of the atom, the energy of electron:
    a) Increases to a greater +ve value b) Decreases to a smaller +ve value
    c) Increases to a greater -ve value. d) Decreases to a smaller -ve value

64. Energy of a photon with a wave length of 450 nm is
    a) 4.36×10^{-12} ergs b) 4.36×10^{-13} ergs c) 4.36×10^{-20} ergs d) 4.36×10^{-11} ergs

65. For the electrons of oxygen atom, which of the following statements is correct?
    a) Z_{eff} for an electron in a 2s orbital is the same as Z_{eff} for an electron in a 2p orbital
    b) An electron in the 2s orbital has the same energy as an electron in the 2p orbital
    c) Z_{eff} for an electron in Is orbital is the same as Z_{eff} for an electron in a 2s orbital
    d) The two electrons present in the 2s orbital have spin quantum numbers, m_s but of opposite sign

66. Which of the following observations was not correct during Rutherford's scattering experiment?
    a) Most of the α-particles passed through the gold foil undeflected
    b) A small fraction of the α-particles was deflected by small angles
    c) A large number of the α-particles were bounced back
    d) A very few α-particles (~1 in 20,000) were bounced back

67. What is the K.E. of photo electrons.
    a) 6.23×10^{-20} J b) 6.25×10^{-22} J c) 6.625×10^{-18} J d) 6.625×10^{-19} J

68. Calculate the energy in joule corresponding to light of wavelength 45 nm (Planck's constant, h= 6.63×10^{-34}Js, speed of light, c= 3×10^{8} ms^{-1}.) :
    a) 6.67×10^{15} b) 6.67×10^{11} c) 4.42×10^{-15} d) 4.42×10^{-18}

69. Which of the following properties of atom could be explained correctly by Thomson model of atom?
    a) Overall neutrality of atom b) Spectra of hydrogen atom
    c) Position of electrons, protons and neutrons in atom d) Stability of atom

70. What are the speed and de broglie wavelength of an electron that has been accelerated by a potential difference of 500V?
a) 5.5 x 10^{-11} m b) 4.5 x 10^{-11} m c) 3.5 x 10^{-11}m d) 6.5 x 10^{-11} m

71. The maximum number electrons in a subshell is given by the expression
a) 4l - 2 b) 4l + 2 c) 2l + 2 d) $2n^2$

72. The correct set of quantum numbers for the unpaired electron of chlorine atom is:
a) 2,0,0,+$\frac{1}{2}$ b) 2,1,-1,+$\frac{1}{2}$ c) 3,1,1,$\pm\frac{1}{2}$ d) 3,0,0,$\pm\frac{1}{2}$

73. Consider the following pairs of ions
i) Sc^{+3} and Ti^{+4} ii) Mn^{+2} and Fe^{+2} iii) Fe^{+2} and CO^{+3} iv) Cu^{+} and Zn^{+2}
Among these pairs of ions, isoclcctronic pairs would include
a) ii, iii and iv b) i, iii and iv c) i, ii and iv d) i, ii and iii

74. The wave length of light having wave number 4000 cm^{-1} is
a) 2.5μm b) 250μm c) 25μm d) 25 nm

75. Difference between incident frequency and threshold frequency is
a) 9.4 x 10^{13} Hz b) 8.5 x 10^{12} Hz c) 9.4 x 10^{12} Hz d) 8.4 x 10^{10} Hz

76. Assertion: For l = 2, m, can be -2, -1,0, + 1 and +2.
Reason: For a given value of l, (2l + 1) values of m_1 are possible.
a) If both assertion and reason are true and reason is the correct explanation of assertion
b) If both assertion and reason are true but reason is not the correct explanation of assertion
c) If assertion is true but reason is false d) If both assertion and reason are false

77. If uncertainty in position and momentum are equal, then uncertainty in velocity is :
a) $\frac{1}{2m}\sqrt{\frac{h}{\pi}}$ b) $\sqrt{\frac{h}{2\pi}}$ c) $\frac{1}{m}\sqrt{\frac{h}{\pi}}$ d) $\sqrt{\frac{h}{\pi}}$

78. Consider the following six electronic configurations (remaining inner orbitals are completely filled) and mark the incorrect option.

a) Stability order: IV > II > III b) Order of spin multiplicity: IV > III = I > II
c) V does not violate all the three rules of electronic configuration
d) If IV represents A^+ when kept near a magnet, acts as diamagnetic substance

79. For an electron to have the same de broglie wave length as that of a Deutron. its velocity should be times that of Deutron
a) 1836 b) 1/1836 c) 3672 d) 1/3672

80. **Assertion:** Scientific notation for the number 100 is expressed as 1 x 10^2.
Reason: The number 1 x 10^2 has two significantfigures.
a) If both assertion and reason are true and reason is the correct explanation of assertion.
b) If both assertion and reason are true but reason is not the correct explanation of assertion.
c) If assertion is true but reason is false. d) If both assertion and reason are false.

81. In the radial probability distribution curve for the 2s orbital of the hydrogen atom, the minor maximum, the node and the major maximum occur at the following distances from the nucleus respectively
a) 1.1A°,0.53A°,2.6A ° b) 0.53A°, 1.1A°,2.6A° c) 2.6A°,1.1A° ,0.53A° d) 0.53A°,2.116A°,2.6A°

82. The number of different spatial arrangements for the orbital with l = 2 is
a) 1 b) 3 c) 5 d) 7

83. The energy absorbed by the electron is
a) 8.5 eV b) 3.4 eV c) 68 eV d) 3.78 eV

84. Assertion: When an iron rod is heated in a furnace, the radiation emitted goes from a lower frequency to a higher frequency as the temperature increases.
Reason: The energy of a quantum of radiation is proportional to its frequency.
a) If both assertion and reason are true and reason is the correct explanation of assertion
b) If both assertion and reason are true but reason is not the correct explanation of assertion
c) If assertion is true but reason is false d) If both assertion and reason are false

85. In potassium the order of energy levels is
a) 4s > 3d b) 4s < 3d c) 4s < 3p d) 4s = 3d

86. A cricket ball of mass 0.5 kg is moving with a velocity of 100 $m.s^{-1}$, the wavelength associated with its motion is:
a) 13.25×10^{-26}m b) 13.25×10^{-34}m c) 13.25×10^{-36}m d) 6.6×10^{-34}m

87. When an electron with charge 'c' and mass 'm ' moves with velocity 'v' around the nucleus having nuclear charge 'Z' in a circular orbit of radius 'r', the potential energy of electron is
a) $\frac{Ze^2}{r}$ b) $\frac{Ze^2}{r^2}$ c) $\frac{-Ze^2}{r}$ d) $\frac{mv^2}{r}$

88. The Correct set of four quantum numbers for the valence electron of Rubidium (Z = 37) is
a) 5, 0, 0, +1/2 b) 5, 1, 0, +1/2 c) 5, 1, 1, +1/2 d) 6, 0, 0, +1/2

89. The energy of an electron in the first Bohr's orbit ofa hydrogen atom is 2.18×10^{-18}J. Its energy in the second orbit would be
a) -1.09×10^{-18} J b) -4.36×10^{-18} J c) -5.45×10^{-19} J d) -8.72×10^{-18} J

90. Which of the following are true for cathode rays?
a) It travels along a straight line b) It emits X-rays when strikes a metal c) It is an electromagnetic wave
d) It is not deflected by magnetic field

91. The de Brogiie wavelength associated with a moving particle of fixed mass is inversely proportional to:
a) Its kinetic energy b) Square root of its kinetic energy c) Square of its kinetic energy
d) Cube of its kinetic energy

92. If the wavelength of the electron is numerically equal to the distance travelled by it in one second, then
a) $\lambda = \sqrt{\frac{h}{m}}$ b) $\lambda = \frac{h}{p^2}$ c) $\lambda = \frac{h}{m}$ d) $\lambda = \sqrt{\frac{h}{p}}$

93. An ion of a d-block elements has magnetic moment 5.92 B.M. Select the Ion among the following.
a) Zn^{+2} b) Sc^{+2} c) Mn^{+2} d) Cr^{3+}

94. The number of electrons which will together weigh one gram
a) 1.098×10^{27} electrons b) 9.1096×10^{31} electrons c) 1 electron d) 1×10^4 electrons

95. A particle X moving with a certain velocity has a debroglie wave length of $1A^0$. If particle Y has a mass of 25% that of X and velocity 75% that of X, debroglies wave length of Y will be:
a) $3\ A^0$ b) $5.33\ A^0$ c) $6.88\ A^0$ d) $48\ A^0$

96. Which of the following ions has the least magnetic moement?
a) Cu^{2+} b) Ni^{2+} c) Co^{3+} d) Fe^{2+}

97. The charge of an electron is 1.6×10^{-19} coulombs. What will be the value of charge on Na^+ ion?
a) 1.6×10^{-19} C b) 3.2×10^{-19} C c) 2.4×10^{-19} C d) $11 \times 1.6 \times 10^{-19}$ C

98. In photoelectric effect work function of any metal is 2.5 eV. The most energetic emitted electron, are stopped by the potential of -1.5 volt then:
a) energy of incident photons is 4 eV b) energy of incident photons is 1 eV
c) photoelectric current increases when we use photons of high frequency
d) energy of incident photons is 3 eV

99. In hydrogen atom, energy of first excited state is - 3.4 eV. Then, KE of same orbit of hydrogen atom is:
a) + 3.4 eV b) + 6.8 eV c) -13.6 eV d) + 13.6 eV

100. Which of the following series of lines are the only lines in hydrogen spectrum which appear in the visible region.
a) Lyman b) Balmer c) Paschen d) Brackett